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# HOWLING PREVENTION METHOD FOR AN AMPLIFICATION SYSTEM

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## 2. Claim

Howling prevention method for an amplification system characterized in that, with a howling prevention method for an amplification system having multiple assemblies of microphones, amplifiers, and speakers, part of the speaker input in one amplification system is extracted and implanted in a speaker output attenuation circuit inserted between the microphone and amplifier of the other amplification system.

## 3. Detailed Explanation of the Invention

[1. Technical Field of the Invention]

The present invention concerns a howling prevention method for an amplification system whereby part of the speaker system is connected to a reversed phase from the other amplification system.

[2. Technological Background and Prior Art Technology]

When a high-output speaker and a high-sensitivity microphone are diffused, the speaker output is picked up by the microphone and an open circuit is created, and the howling phenomenon, whereby the system vibrates due to audible frequency sounds, easily occurs. Therefore, the usage situation is such that valuable performance is not sufficiently utilized, and is saved. In order for the howling phenomenon not to be generated, the addition of improvements to amplification circuits and the like has caused the circuit

structures to become extremely complex.

[3. Objective of the Invention]

The objective of the present invention is to offer a howling prevention method with a new circuit structure in the output circuit of a microphone, in order for the structure to be simple and the generation of the howling phenomenon to be prevented effectively.

[4. Structure of the Invention]

The structure of the present invention is such that, with a howling prevention method for an amplification system having multiple assemblies of microphones, amplifiers, and speakers, part of the speaker input in one amplification system is extracted and implanted in a speaker output attenuation circuit inserted between the microphone and amplifier of the other amplification system.

[5. Embodiments of the Invention]

The present invention is explained below with reference to the drawings. Figure 1 shows a structural diagram of the first embodiment of the present invention. (M1, M2) are microphones, (S1, S2) are speakers, (A1, A2) are speaker amplifiers, (T1, T2) are speaker output component attenuation circuits, and (D1, D2) are variable delay circuits. The system indexed as (1) forms one amplification system, and the system indexed as (2) forms the other amplification system. A device which cuts the intermediate point (Q) of the other amplification system and measures the output level of the attenuation circuit (T2) is installed. The input from the microphone (M1) passes through the attenuation circuit (T1), is amplified by the amplifier (A1), and is amplified from the speaker (S1). Part of the input side of the amplifier (A1) is input into the attenuation circuit (T2) of the other amplification system through the delay circuit (D1). Part of the output of the

speaker (S1) is picked up by the microphone (M2) and reaches the attenuation circuit (T2). Adjustment of the amplification system may be carried out by making the input from the microphone (M1) into a pulse form. When the transmission time from the speaker (S1) to the microphone (M2) is T1, the delay time of the delay circuit (D1) is tentatively selected as T1, the connection from the microphone (M2) to the attenuation circuit (T2) is cut once, and after input is provided to the microphone (M1), there is a connection after T1 elapses. The output of the delay circuit (D1) is linked so that it becomes a reverse phase in the signal of the speaker (S1) input from the microphone (M2). Amplification of the speaker (S1) begins, and after being transmitted to the microphone (M2), because the output from the delay circuit (D1) at the attenuation circuit (T2) is linked, the output level at the intermediate point (Q) should be zero, so this is confirmed. When it is not zero, post-adjustment and level adjustment are carried out. Next, the intermediate point (Q) of the amplification system is connected; the intermediate point (P) of one of the amplification systems is cut, and an output level meter is connected. The delay circuit (D2) is adjusted so that the output is not present at (P) when input from the microphone (M2) in the same manner as described above. Subsequently, when P and Q are both connected and the amplification system is in a normal state, the connection components between the speakers and microphones become extremely small, and howling does not occur.

Figure 2 shows a second embodiment of the present invention. It is an improvement over the first embodiment in that takes advantage of the differences in the microphone and speaker frequency characteristics. On the front stage of the speaker (S1), band rejection filters (BEF1, BEF2, ...) are provided, and for their respective intermediate

frequencies, those with a comparatively high sensitivity to the microphone are selected. Because these frequency components do not attain a high level in the microphone (M2), the amplification rate of the amplification circuit is small, and it becomes increasingly difficult for the howling phenomenon to occur. Naturally, this is also installed on the front stage of the speaker (S2). With respect to the speakers, their frequency band is considered, and this occurs in the same manner even when a band rejection filter (BEF) is inserted so as to obstruct the high frequency of the speaker on the microphone output side. It is also effective to insert filters on both the speaker side and the microphone side.

[6. Results of the Invention]

In this manner, based on the present invention, because of the fact that part of the signal to the speaker at the microphone output side is received at a reverse phase and is linked, howling can be effectively prevented with a simple structure. Therefore, conversations are possible at the same time that this is applied to an intercom, and telephone calls using subscriber telephones can easily be made.

4. Simple Explanation of the Drawings

Figure 1 is a structural diagram showing the first embodiment of the present invention.

Figure 2 is a structural diagram showing the main parts of the second embodiment of the present invention.

M1, M2: microphones

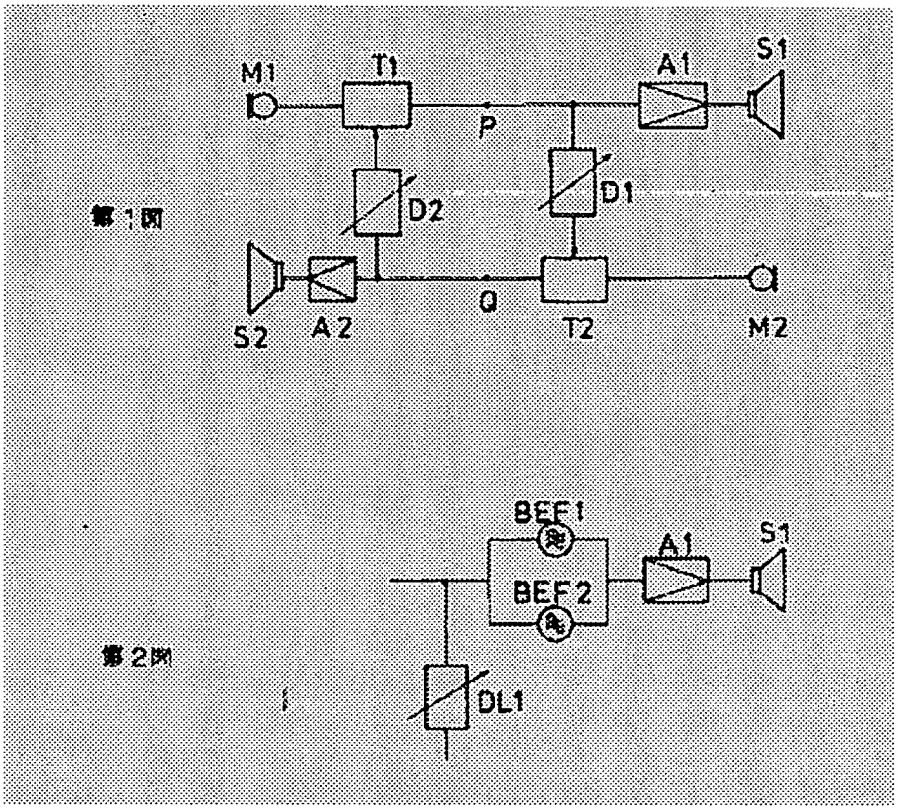
S1, S2: speakers

A1, A2: speaker amplifiers

T1, T2: speaker output component attenuation circuits

D1, D2: variable delay circuits

BEF1,. BEF2: band rejection filters

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